

## DECLARATION OF DR. BALA DHANDAPANI

I, Bala Dhandapani, residing at 30 Marion Circle, Eastampton, NJ 08060, declare and state that:

1. I received a Bachelor of Science Degree in Chemical Engineering from Anna University, Madras, India. I received a Doctorate Degree in Chemical Engineering in 1993 and a Masters of Science Degree in Chemical Engineering in 1990 from the Clarkson University, Potsdam, NY.

2. From 1997 to present, I have been employed as a Project Manager at BlackLight Power Inc., Cranbury, NJ, where I manage and conduct synthesis and characterization of novel hydride compounds.

3. From 1994-1997, I was employed as a Postdoctoral Research Associate and Laboratory Coordinator at Virginia Tech, Blacksburg, VA, Environmental Catalysis and Materials Laboratory, where I conducted synthesis, characterization, testing and development of novel catalytic materials for various environmentally significant reactions. I also managed the research activities of the lab of 12 researchers, including doctoral, masters and undergraduate students.

4. From 1990 - 1993, I was employed as a Research Assistant at Clarkson University, Potsdam, NY, wherein I studied the application of foam and monolith substrates for environmental catalysis. I also designed and constructed a reactor system with advanced instrumentation.

5. From 1988-1990, I was employed as an Instructor/Teaching Assistant at Clarkson University, where I taught the following courses: Unit Operations Laboratory, Reaction Engineering and Analysis, Advanced Reactor Design, Heterogeneous Catalysis, Material Science and Corrosion Engineering Laboratory.

6. I am experienced on the following instrumentation: AMETEK Quad Mass Spectrometer; Varian 3700 Gas Chromatograph; ISI-40 Scanning Electron Microscope; Siemens D 500 X-ray Diffractometer; Micromeritics ASAP 2010 Chemi; CHNS-EA1180 Elemental Analyzer; Perkin Elmer PHI 5300 ESCA; BioRad FT-60 Infrared spectroscopy; Mariner ESI-ToF Mass Spectrometer; HP 5890 and 6890 Gas Chromatograph; HP1100 HPLC; and Kratos XSAM800 XPS.

7. My research experience includes the synthesis of novel materials including: high surface area catalytic materials including monometallic and bimetallic transition metal carbides, nitrides, phosphides, hydrides and sulfides; noble metals and transition metal oxides; active catalytic materials supported on alumina, activated carbon, silica and titania; and high surface area activated carbon and silica from various precursors.

8. My research experience also includes the characterization of materials using the following techniques: X-ray diffraction; X-ray photoelectron spectroscopy; FTIR spectroscopy; Electrospray Ionization Time of Flight Mass Spectroscopy; Time of Flight Secondary Ion Mass Spectroscopy; Solids Probe Mass Spectroscopy (Quadrupole,

Magnetic Sector and Time of Flight); Proton Nuclear Magnetic Resonance; Scanning Electron Microscopy; Physisorption and Chemisorption techniques; Temperature programmed experiments; and Conductivity measurements Inductively Coupled Plasma Mass Spectrometry (elemental analysis).

9. My research experience further includes the development of catalytic materials, including: Optimization of synthesis conditions; Inclusion of additives, stabilizers and binders; and Fabrication of catalysts on monolith and foam substrates.

10. My research experience further includes the testing and evaluation of catalysts, including: Ozone decomposition reaction; Hydrogenation of aromatic compounds; Hydrodenitrogenation (HDN), hydrodesulfurization (HDS), hydrodeoxygenation (HDO) of various model compounds at high pressure reaction conditions; Hydrodechlorination (HDC) of chlorofluorocarbons; and Reforming of methane using membrane and plug flow reactors.

11. My research experience further includes kinetics and mechanism, including: Catalytic ozone decomposition reaction; Hydrogenation of isopropyl benzene; Simultaneous HDN, HDS and HDO of various heterocyclic aromatic compounds; and Hydrodechlorination of CFC-12 to HCFC-22 and HFC-32.

12. A selected list of my publications is attached.

13. I supervised the preparation of the compounds shown in the following Tables 1 and 2. Table 1 includes new compounds comprising hydrinos formed using catalysts for forming hydrinos (lower energy hydrogen) from hydrogen. The process used for forming the compounds comprising hydrinos is described in Dr. Randell L. Mills U.S. serial No. 09/009,294 and published PCT/US98/14029 application. Table 2 includes control compounds comprising conventional elements and energy states.

14. Blind samples of the compounds were sent to Dr. Gary L. Turner of Spectral Data Services, Inc. to conduct Nuclear-Magnetic-Resonance (NMR) evaluation of the samples. The results of the NMR analysis is shown in the Tables 1 and 2.

Summary of new hydrino hydride compounds that showed novel features with solid state MAS  $^1\text{H}$  NMR spectroscopy

Table 1

Compound	Data file	Reactants	$^1\text{H}$ NMR Features
KHI	blps00as.14	KI, K, $\text{H}_2$	-2.5*, 1.1
KHI	blps0095.005	K, KI, $\text{H}_2$	-3.2*, 0.9
KHCl	bpls99as.078	K, KCl, $\text{H}_2$	-4.4*, 4, 1.1
KHBr	bpls99as.058	K, KBr, $\text{H}_2$	-4.1*, 5.9, 4.3, 1.2
RbHF	bpls99as.034	RbF, K, $\text{H}_2$	-4.4*, 1.2

\* novel features

## Summary of relevant controls performed

Table 2

Control Compound	Data File	<sup>1</sup> H NMR Features
KH	blps00as.038	1.1, 0.8, 4.6
KH + KI	blps00as.099	1.1, 0.8, 4.5
KH + KCl	blps00as.097	1.1, 0.7, 4.3
KH + KBr	blps00as.101	1.1, 0.8, 4.2
RbH	textfr.1.txt	0.83, 4.0
RbH + RbF	blps00as.103	1.0, 4.9

1.1, 1.0, 0.8, 0.7 ppm is associated with M-H (where M is K or Rb),  
4-4.9 ppm is associated with M-OH (where M is K or Rb)

15. I analyzed XPS and TOFSIMS spectroscopy to determine the elements (cations and anions), such as the potassium and halides, present in each of the compounds. I also performed a Gas Chromatograph (GC) to determine whether hydrogen present in each of the compounds.

## CONCLUSIONS

16. Negative numbers in the compounds of Table 1 represent an upfield shift, which means that the electron is closer to the proton in the hydrogen. Thus, the upfield chemical shifts observed by the NMR data indicate that new lower energy states for the hydride ions (hydrino hydride ions) may exist.

17. I declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

By D. Dhandapani  
Dr. Bala Dhandapani

Date: 8/19/2000

SELECTED PUBLICATIONS

J. Y. Wang, B. Dhandapani, D-T. Chin, An Experimental Study of Mass Transfer in Pulse Reversal Plating, *Journal of Applied Electrochemistry*, 22, 240, 1992.

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